

Integrated Parasite Management for Your Goats

Know Your Parasites

Significance

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- Internal parasites are the number one health problem of goats in the Southern United States.
- New York has:
- Warm moist weather in spring and early summer conducive to parasites.
- Hot moist summers good for the Barberpole worm.

Worms (Internal Parasites)

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- Mother Nature's population control police-keep populations from overrunning area when production conditions are good, but also reduce populations when feed is limiting.
- Worms are normal. Excessive worms causes severe health problems.

Problem: Dewormers Don't Work

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- Ignorance
- Lack of management
- Therapeutic approach
- Overuse of dewormers
- Dewormer resistance is the greatest threat on the horizon to small ruminant production.

Problem: Dewormer Don't Work

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- Previous parasite control strategies have been built around the use of dewormers only.
- With dewormer resistance, our paradigm must change if our goats are going to survive.
- Use an integrated pest management approach (IPM).

IPM Principles

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- Identification of pest
- Knowledge of biology and life cycle
- Plan how to use management practices for prevention of infection
- Monitor animals for infection
- Deworm when management alone is not sufficient
- Evaluation of results
- Feedback to modify plan

Identification of Pest

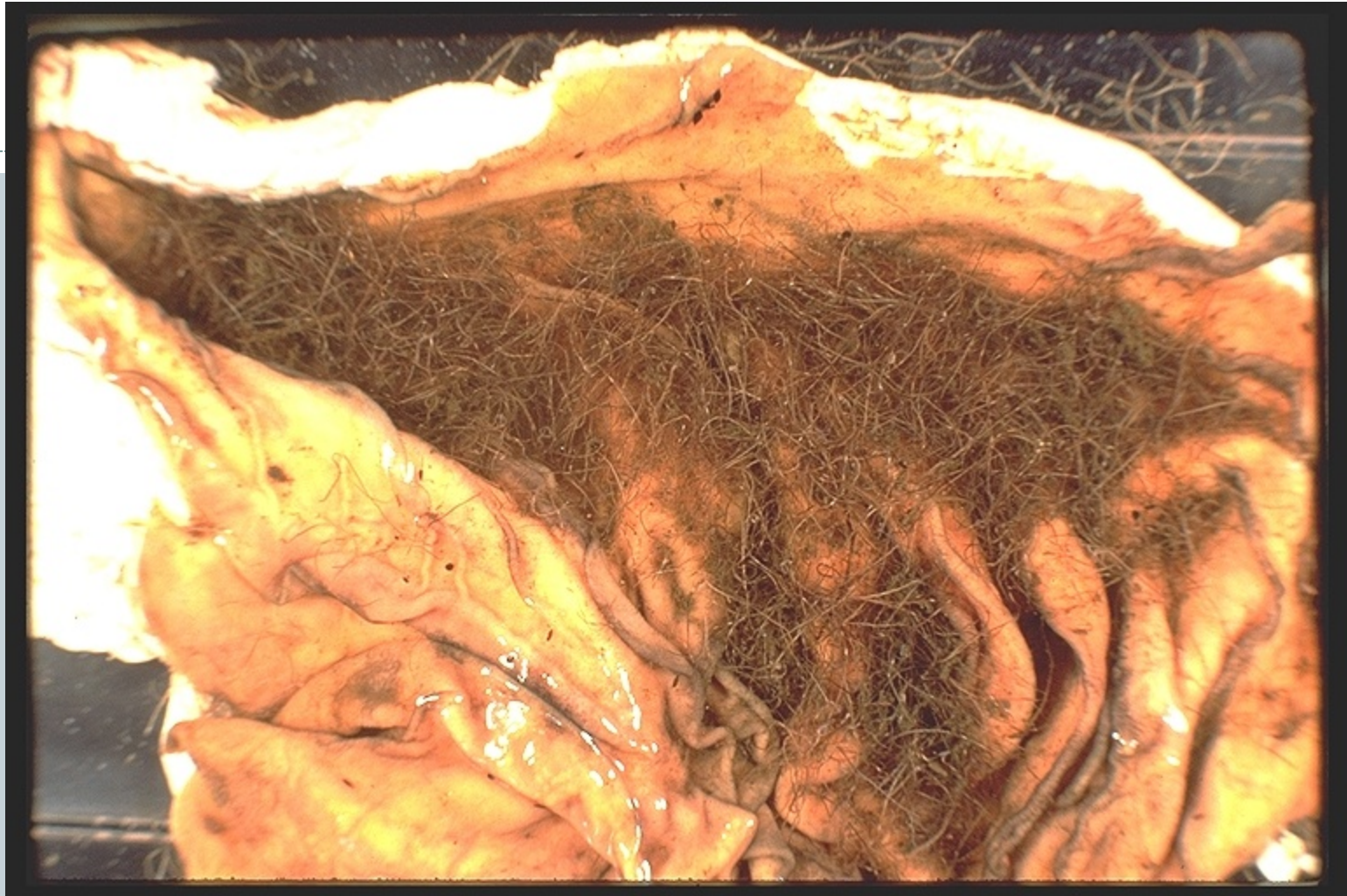
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- Barberpole worm, *Haemonchus contortus*, feeds on blood in abomasum, causes anemia, poor performance and death. Tropical roundworm, likes it hot and moist. Major cause of deaths in goats due to worms.

Barberpole Worm

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- *Barberpole worm* adults in the abomasum

Temperate Roundworms

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- Bankrupt worm, *Trichostrongylus colubriformis*, feeds on mucus in small intestine, causes diarrhea, reduced appetite, poor performance.
- Brown stomach worm, *Teledorsagia circumcincta*, or *Ostertagia*, feeds on secretory cells of abomasum and causes loss of blood plasma, diarrhea, bottle jaw reduced appetite, poor performance.

Other Internal Parasites

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- Tape worm
- Affects basically young animals in confined management.
- Identify as flecks of rice in feces.
- Causes slow growth, poor performance and enterotoxemia.
- Use a dewormer effective against tapeworms.

Worm life cycle

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- Life cycle is very important to understand so you know some actions to take to reduce worm problems and also, why some environmental conditions or management practices increase worm problems so that you can be alert for parasite problems.

Life Cycle 2

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- Egg in feces from animal falls to ground.
- Requires warmth 50+F and humidity to hatch to first stage larva, abbreviated L-1 in 1-6 days.
- Winter parasites are less of a problem.
- Dry hot summer parasites are less of a problem.



- Roundworm egg

On Pasture -



- Direct sunlight can heat fecal pellet to 155°F and sterilize pellet – **This is an excellent time to mow a pasture short to aid in drying the fecal pellet**
- Shade trees and tall, dense grass increase humidity and protect fecal pellets from the sun → increase problem
- Diatomaceous earth may help pellet to dry out and reduce viability of larvae?

Life Cycle 4

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- L-1 eats bacteria in feces and grows, molts (sheds skin like a snake) and becomes L-2.
- L-1 and L2 are subject to being killed by drying out. Heat and low humidity will kill them in the pellet.

Life Cycle

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- L-2 eats bacteria in feces and grows and molts to L-3. However, the cuticle (skin) is not shed, so the L-3 has 2 layers of cuticle. This makes the L-3 much more resistant to drying out.



- Note how the old cuticle is surrounding the L3 stage.
- This means the L3 can't feed and must rely on stored metabolites or energy to survive.

Life Cycle 5

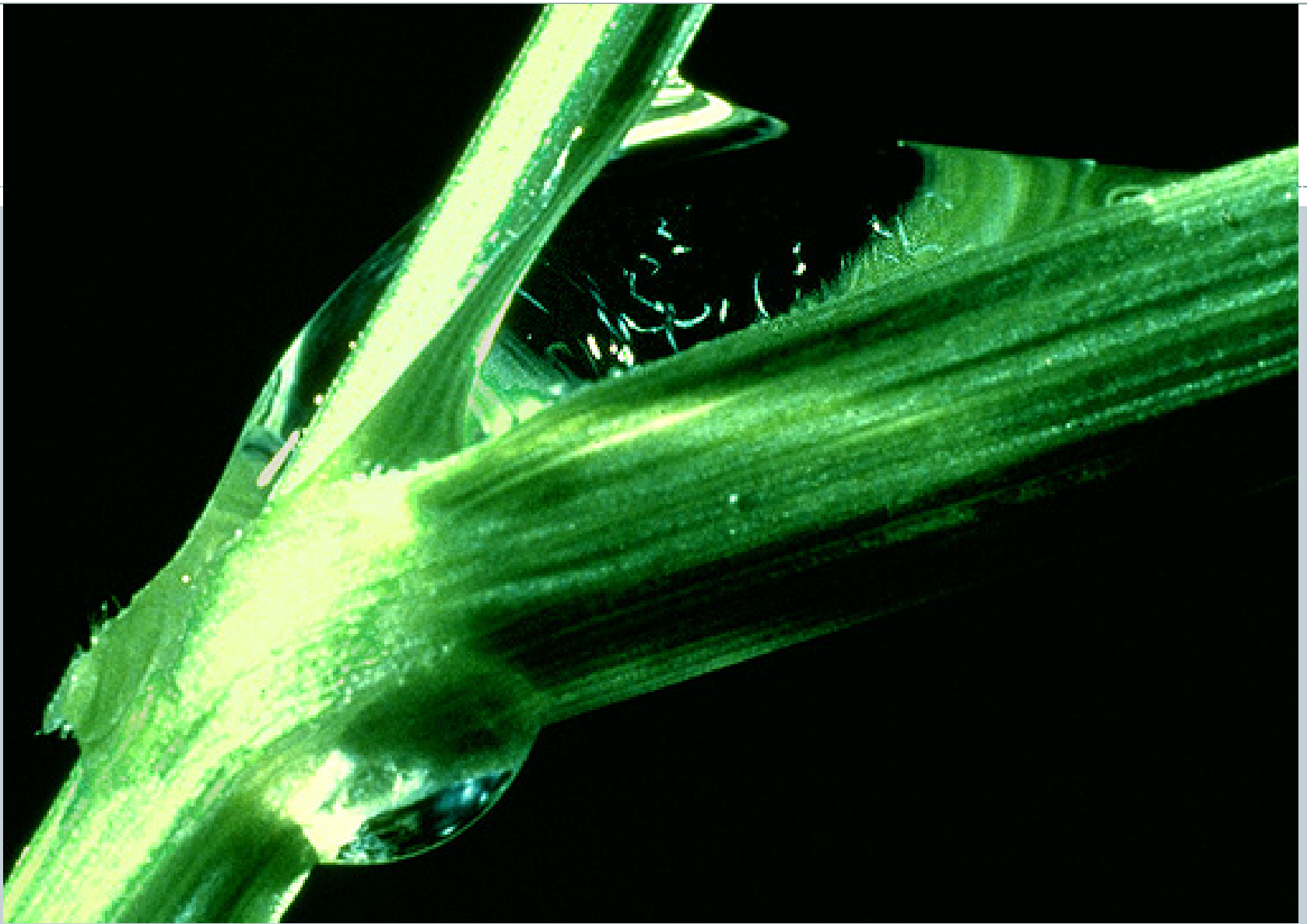
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- However, the L-3 cannot eat, because his mouth is covered. He must live off his stored reserves.
- Since he is cold-blooded, his metabolism speeds up when it is hot and uses the stored reserves up faster. He can only live about 30-60 days in hot weather or 120-240 days in cool weather.

L3 – on pasture

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- The L-3 must escape from the fecal pellet to infect an animal – **Dung beetles?**
- The L-3 can only live about 1-2 weeks inside a fecal pellet if it is hot and dry. Instead, pellet must be broken up by rain (**2 inches in a month's time**) →
- Then the larvae scoots on a film of water (from rain or dew) to get under fallen leaves, etc. OR get about 2 inches up onto fresh forage .



- L3 larvae caught in a dew droplet on a stem of grass

In a grazing system for small ruminants we are:

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- Generally trying to move animals before the pasture is below 3 inches and **get back in before pasture gets too mature (lignified)**
- But for barber pole worm control we often recommend moving every 4 to 7 days and **resting a paddock for 60 to 105 days**

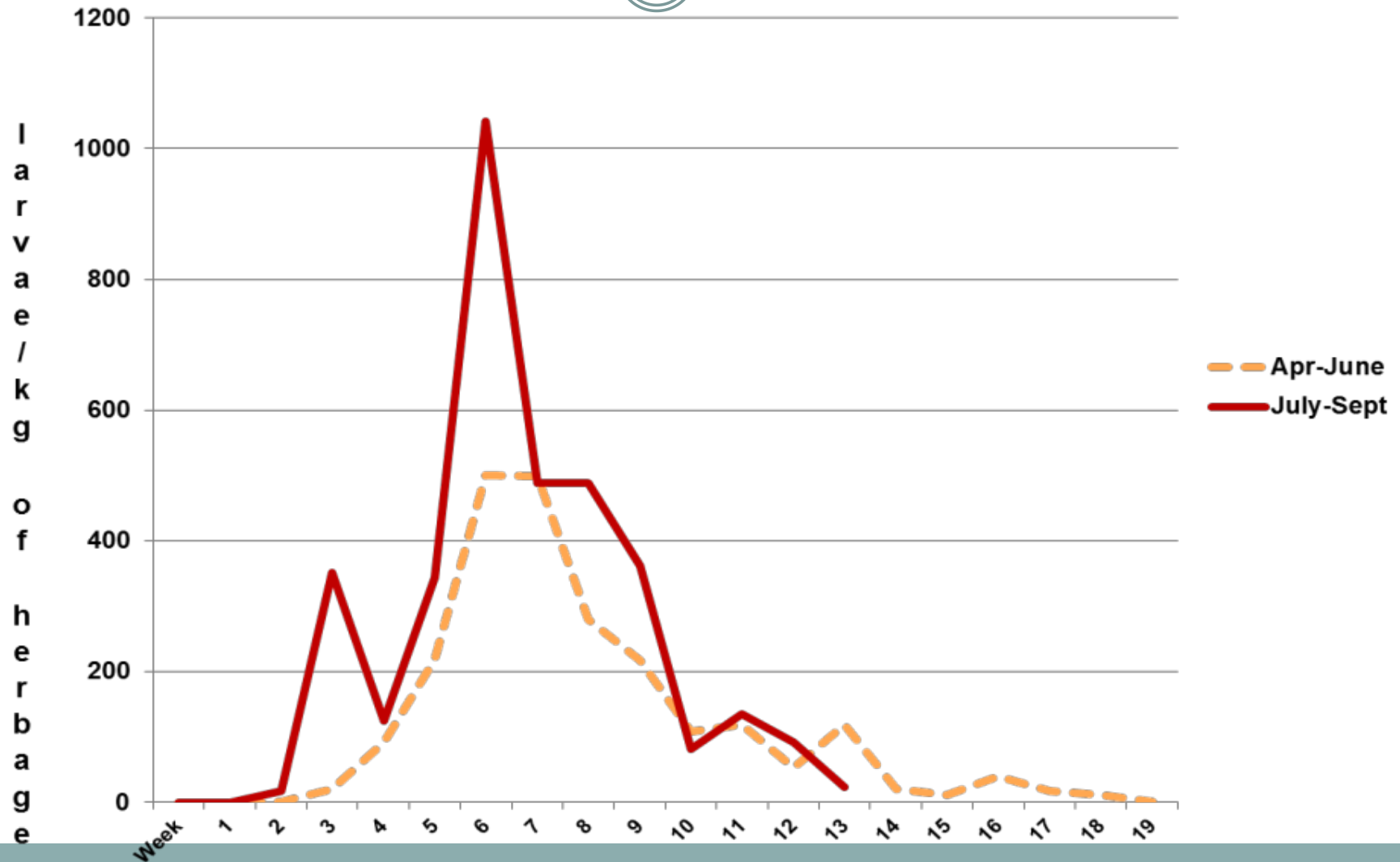
Evasive Grazing

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- Move animals fast enough to prevent infection from feces deposited during current grazing period (autoinfection). **Takes 3-5 days to hatch at 77-79°F, 15-30 days to hatch at 50–52°F. Often ~5 to 14 days from egg to L3.**
- **Play it safe with 4 day (wet, warm) to 7 day (cooler, drier) grazing duration. Move earlier if pasture getting too short – i.e. 3 inches.**
- Allow a long enough rest period that there is substantial L3 die off before animals return to graze. (60 – 105 days)

Barber pole worm population in TEMPERATE CLIMATE pastures grazed 2 to 4 weeks

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Problem



- Pasture rest periods to control barber pole worm need to be longer than normal recommendations for either pasture health or nutritional value

Things you can do -

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- Give priority to recently weaned young stock → lactating does/ewes → dry animals
- Can you disrupt the worm cycle and also keep your pastures from growing too fast in long rest period by
 - mowing the pasture extremely short as soon as animals leave pasture – beginning of rest period when lots of L1 and L2 are still trapped in feces
 - grazing cattle or horses during the rest period –
 - ✦ time it when lots of L3 have hatched out
 - Harvesting hay crop from it

L3 continued

(barber pole worm life cycle)



- About 2-10% of eggs end up as L-3 larvae on forage.
- From there, it must be eaten by a goat or sheep to continue development - **Cattle and horses can “vacuum up” L3 larvae from goat and sheep pastures and stop its life cycle**
- L-3 can not survive outside in NE winters
- Once the L-3 is inside the goat it leaves its sheath and molts to L-4 and can over-winter in the goat in suspended animation. Stops hibernating ~March.

Life Cycle 9

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- Arrested form of L-4 does not stimulate animal's immune system and is harder for dewormer to kill.
- Barber pole worm may be killed by freezing but overwinters as arrested L-4 and survives hot dry summers in the goat.
- Otherwise L-4 molts to L-5 which is adolescent which develops ovaries and uterus and then molts to an adult, mates and lays thousands of eggs per day.

Arrested Form

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- Triggered to awake and develop by kidding/lactation/increasing daylength.
- Awakes when old worms die off or are killed by dewormer.
- Reason for old recommendation of deworming a second time two weeks after deworming with Benzamidole dewormers.

Immune Response

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- Good nutrition stimulates immune system.
- Can select goats for low fecal egg counts.
- Other diseases which depress immune system (e.g. coccidiosis, pneumonia) can cause increased worm problems.
- Can also identify more resistant animals by using FAMACHA and selecting animals requiring least deworming during the year.

Life Cycle 10

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- Goats have a weak immune response against parasites due to originating in desert areas where there were no challenges from worms.
- However, some individual goats have greater resistance to worms than others. Some breeds appear to have a greater proportion of more resistant animals.

Life Cycle 11

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- When goats are lactating, immune system is suppressed and does not effectively fight parasites.
- Arrested larvae acquired during the fall
- All mature simultaneously in the spring during lactation. Rationale for deworming around kidding time.

Lifecycle 12

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- Young goats have a poorly developed immune system which makes them susceptible to worms.
- Immune system does not mature until around one year of age.

Management Practices for Prevention

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- 1. Stocking rates < 2 hd/ acre
- 2. Grazing cattle or horses with goats
- 3. Don't graze close to ground
- 4. Haymaking or tillage
- 5. Pasture rotation with 6 or more weeks rest (depends on temperature)
- 6. Browse or animals eating high off (away from) the ground
- 7. Cull wormy animals

Barber Pole Worm

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- Dominant species in warm climates.
- Produces 1-6,000 eggs/day.
- Develops dewormer resistance more rapidly than other species because of 3-4 wk generation interval.

Risk Factors for Barber's Pole worm

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- 1. Warm weather
- 2. Two inches of rain in a month
- 3. Grazing pastures short
- 4. High stocking rates
- 5. Thin animals
- 6. Animals in lactation
- 7. Long residence on a pasture

Symptoms of Barber Pole Worm

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- Barber pole worm consumes 1-5 drops of blood per day. 1,000 nearly a pint of blood in a week.
- Causes anemia (low red blood cell number), hypoproteinemia (low blood protein) edema and ultimately death
- Blood is normally 36% red blood cells
- Deworm when 20% red blood cells
- Goat near death at 8% red blood cells
- Coccidiosis, liver fluke, lice and external parasites can also cause anemia

Monitoring Barber Pole Worm Infection

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- Look at color of mucous membranes-under lower eyelid, gums, inside vulva. Good pink color is good, pale watery color indicates anemia.
- Make a habit of noticing animals with white around eyes.

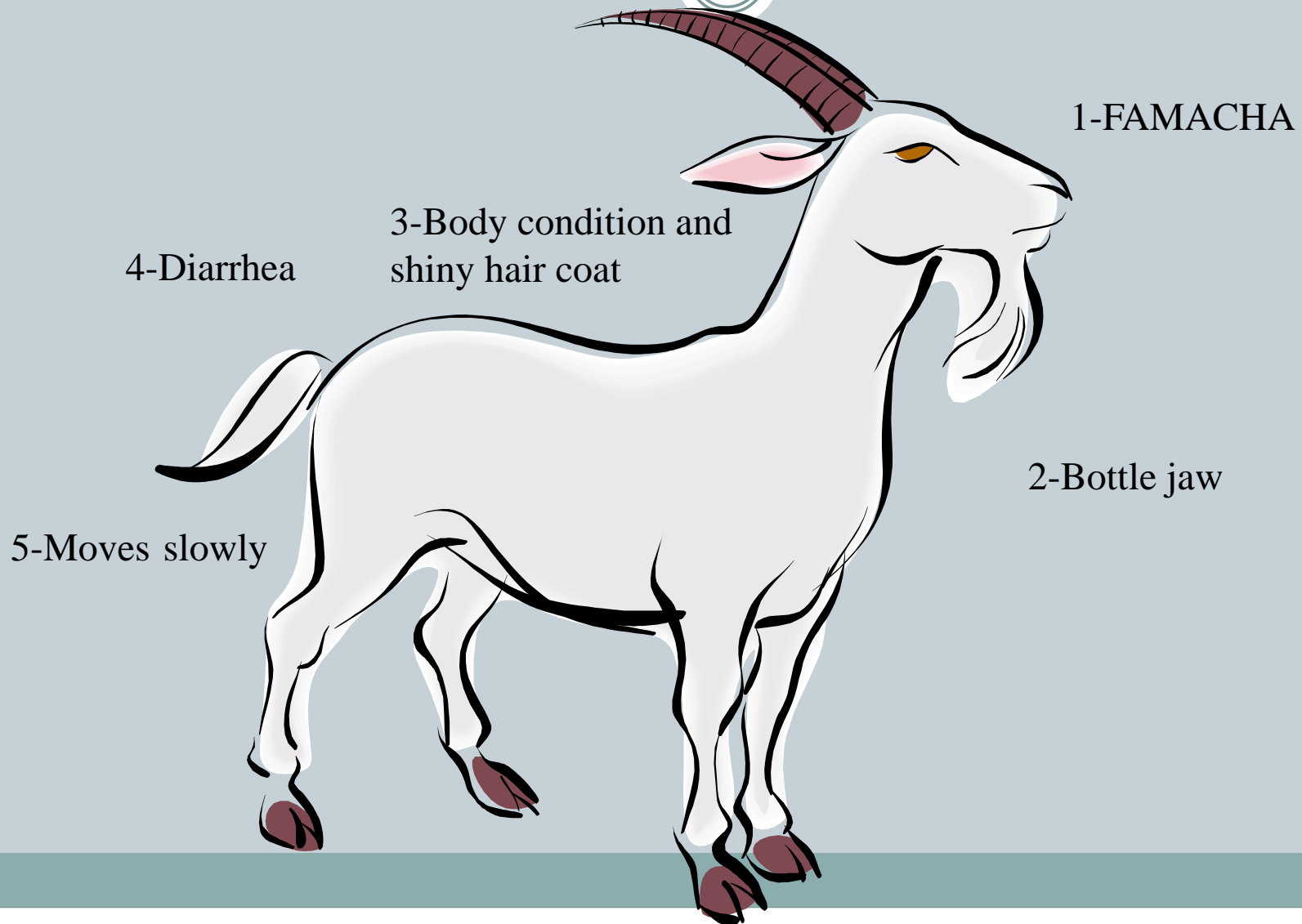




Bottle Jaw-bulge under throat from edema

Five Point Check

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Symptom of Barber Pole Worm

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- Fecal egg counts are the best measure, reflecting the number of mature worms in the goat.
- Takes 1-2 weeks from L-3 to egg laying adult-it is possible to accumulate enough worms to have anemia and fecal egg count not yet increased. Is rare.

Planning a Parasite Control Program

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- 1. Use management practices that are applicable to your farm to prevent worms.
- 2. Monitor parasite problems with fecal egg counts or eye scores.
- 3. When you have a parasite problem determine why and change parts of management that you can.
- 4. Only use dewormer when necessary.

Planning a Parasite Control Program

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- 5. Cull wormy animals.
- 6. Deworm new animals coming on your place with 2 classes of dewormer and check feces one week later.
- 7. Notice eye mucous membrane color when you check animals.
- 8. Use good nutrition.

Conclusion

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- If you do not manage your parasites, they will manage to put you out of the goat business.